Newton's Laws Assignment NAME_____

1. A tractor is pulling a car to the right with 5320 N of force and the mud the car is stuck in is pulling with 5211 N of force in the opposite direction.
   a) Calculate the net force on the car. (2)
   b) Calculate the mass of the car if it weighs 10388 N (2)
   c) Hence calculate the acceleration of the car (2)

2.
   a) Compare the force required to stop an object with the force to start it moving. (1)
   b) State the effect friction would have on these forces. (1)

3. Describe the difference between mass and weight (1)

4. When you jump, the Earth is pushed away from you. Use a formula to explain why this movement of the Earth isn't noticed. (2)

5.
   a) Calculate the force of friction acting on a 78 kg skydiver falling at terminal speed. (2)
   b) Explain the effect opening a parachute would have on the skydiver's terminal speed. (2)

6. State Newton's first law. (2)

7. If a crate is initially at rest it takes a lot of force to get it moving and then a much smaller consistent force to keep it sliding at constant speed.

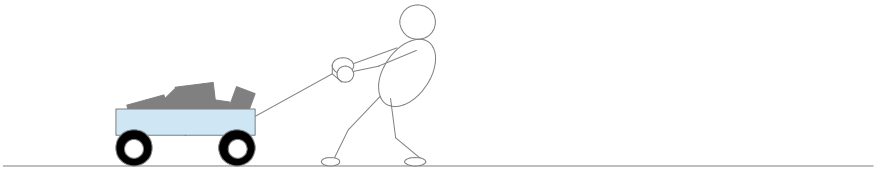
   a) If the force of friction acting on a sliding crate is 15.42 N, state the force required to maintain a constant velocity. (1)

   b) State the net force on the crate at constant velocity. (1)

   c) You accelerate the crate to a faster speed and then maintain its motion at that speed. Explain the effect this has on the force required to maintain constant speed. (2)

8. Compare the force on a cricket ball by a bat with the force on the bat by the ball. (1)

9. Josie is pulling a cart full of bricks, no doubt for some nefarious purpose. The cart full of bricks is heavier than Josie.
   For this question, Josie remains stationary and the cart accelerates to the right.



   a) Draw all the horizontal forces acting on the cart, the forces acting on Josie, and the forces acting on the ground. Ignore air friction. Make sure vectors (arrows) that should be the same length, *are* the same length. (2)

   b) List all the action-reaction pairs. (2)

   c) Explain why the cart accelerates but Josie doesn't. (2)

   d) State the direction of the Earth's acceleration. (1)

   e) If the cart and bricks have a mass of 112 kg, the force of friction with the ground is 50N and Josie is pulling with 428N, calculate the magnitude of the cart's acceleration. (3)

10. Explain why, in a frictionless environment, two objects with different masses will experience different forces due to gravity but the same acceleration. (2)